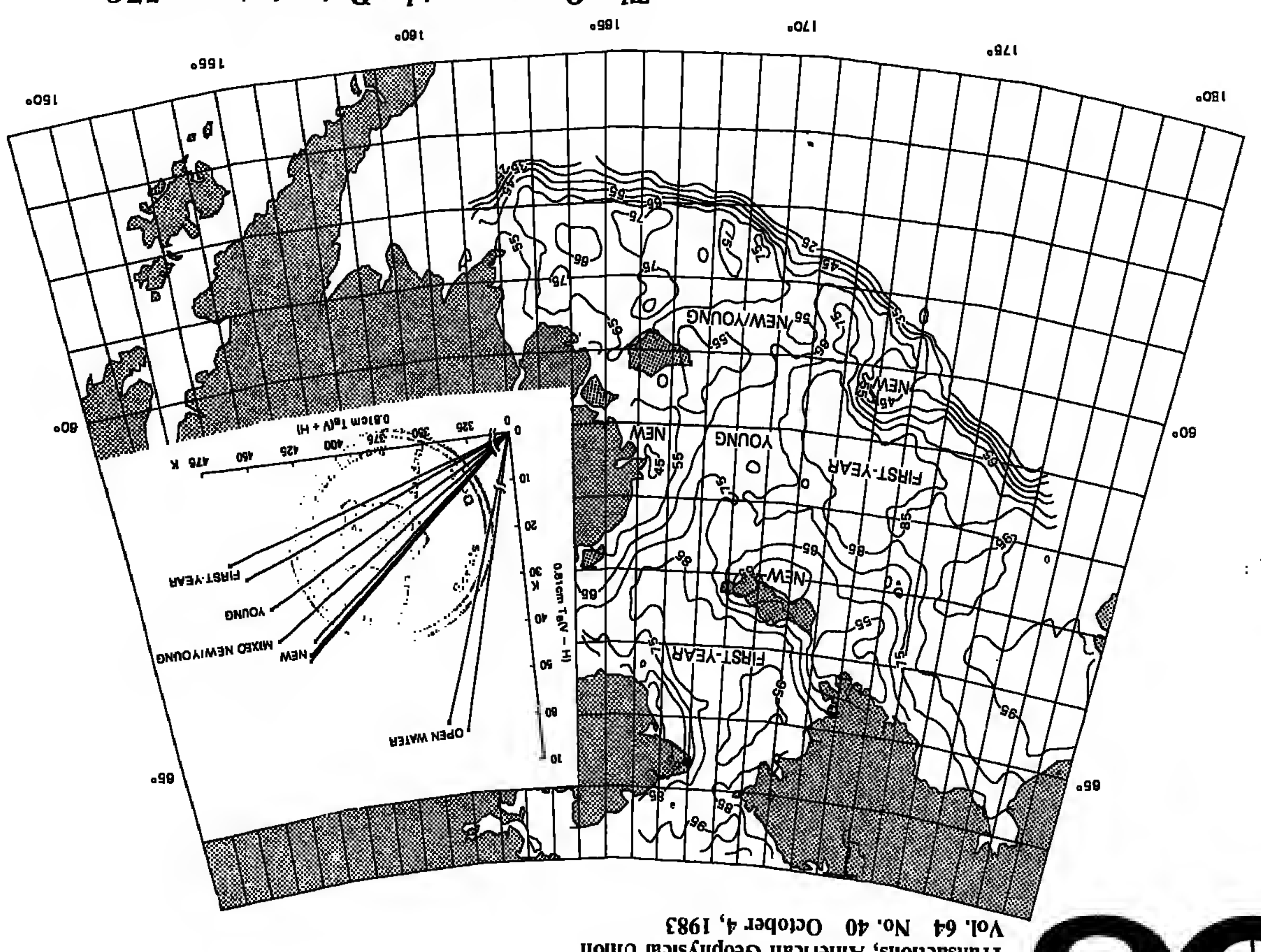

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Solar Physics, Astrophysics, and Astronomy

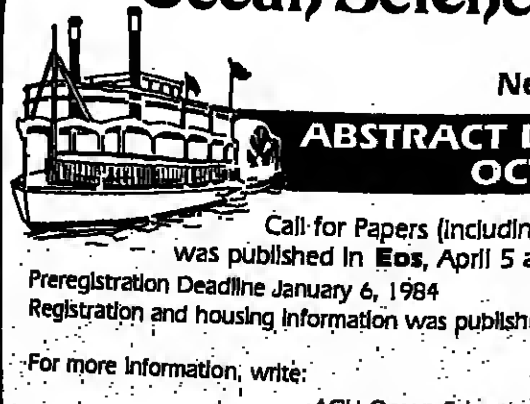
7710 Corona
POSSIBLE OBSERVATION OF A DISCONNECTED MAGNETIC STRUCTURE IN A CORONAL TRANSIENT
R. M. E. Illing and A. J. Hundhausen (High Altitude Observatory, National Center for Atmospheric Research, P.O. Box 3000, Boulder, Colorado, 80307)
We present SMM Coronagraph/Polarimeter observations of the coronal transient of 15-16 March, 1980, which shows a bright front convex toward the sun propagating out through the corona at 175 km sec^{-1}. A fan-shaped bright region connecting this front to the inner corona collapses into a narrow bright ray over the next few hours. We interpret these observations as resulting from the disconnection of magnetic loops from the underlying prominence-like loop structures seen rising earlier in the event. Other similar "inverted arches" exist in the C/P data, but are usually seen with poorer temporal resolution.
J. Geophys. Res., Blue, Paper 3A1447

7720 Electromagnetic Radiation
DIFFERENCES IN THE TEMPORAL VARIATIONS OF SOLAR UV FLUX, 10.7 cm SOLAR RADIO FLUX, SUNSPOT NUMBER AND Ca-K PLAGE DATA CAUSED BY SOLAR ROTATION AND ACTIVE REGION EVOLUTION
R. F. Donnelly (NOAA ERL ARL, Boulder, Colorado 80303), D. F. Heath, J. L. Lean, and G. J. Rottman
Two types of temporal variations in the solar UV spectral irradiance, caused by solar rotation and active region evolution, are presented and discussed. These particular UV variations differ markedly from the concurrent variations in the 10.7 cm radio flux and sunspot number. The temporal variations of the modeled UV flux based on Ca-K plage data are similar to the observed UV flux. The first type of dissimilar temporal behavior occurs when concentrations of solar active regions evolve at solar longitudes nearly 180° apart. Both the UV observations and modeled UV fluxes based on Ca-K plage data then show strong 13-day periodicity while the 10.7 cm solar radio flux and sunspot number exhibit quite dissimilar temporal variations. This type of dissimilarity is related to the UV and Ca-K model having a dependence on the solar central meridian distance that is narrower than that for the 10.7 cm radio flux or for sunspot numbers. A second case of marked dissimilarity occurs when major new solar active regions arise and dominate the full disk fluxes for several rotations. The strongest peaks in 10.7 cm and sunspot numbers tend to occur on their first rotation, for example during major dips in the total solar irradiance, while the Ca K plages and UV enhancements peak on the next rotation and then decay more slowly on subsequent rotations. This type of dissimilarity is related to major active regions having a more rapid growth, peak and decay of sunspots, their strong magnetic fields and related coronal radio emission at centimeter wavelengths than for the Ca K plages and their related UV enhancements. (solar, ultraviolet, plage, sunspot number).
J. Geophys. Res., Blue, Paper 3A1463

7740 Magnetic Fields (Heliospheric Current Sheet)
THE STRUCTURE OF THE HELIOSPHERIC CURRENT SHEET: 1978-1982
J. Todd Hoeksema (Electronic Research Laboratories (328) Stanford University, Stanford, California, 94305), John M. Wilcox and Philip H. Scherrer
The structure of the heliospheric magnetic field changes substantially during the 11 year sunspot cycle. We have calculated its configuration for the period 1976 through 1982 using a potential field model, continuing our earlier study near solar minimum in 1976-1977 (Hoeksema et al. 1982). In this paper we concentrate on the structure during the rising phase, maximum, and early decline of sunspot cycle 21, from 1978-1982. Early in this interval there are four warps in the current sheet (the boundary between interplanetary magnetic field (IMF) toward and away from the Sun) giving rise to a four-sector structure in the IMF observed at Earth. The location of the current sheet changes slowly and extends to a heliographic latitude of approximately 50°. Near maximum the structure is much more complex with the current sheet extending nearly to the poles. Often there are multiple current sheets. As solar activity decreases the structure simplifies until, in most of 1982, there is a single, simply shaped current sheet corresponding to a two-sector IMF structure in the ecliptic plane.
J. Geophys. Res., Blue, Paper 3A1464

Tectonophysics

8199 General
DEEP-SEATED FLOW AS A MECHANISM FOR THE UPLIFT OF BROAD FOREARC RIDGES AND ITS ROLE IN THE EXPOSURE OF HIGH P/T METAMORPHIC TERRANES
Terry L. Pavlis and Ronald L. Bruhn (Department of Geology and Geophysics, University of Utah, Salt Lake City, UT 84112)
Forearc systems evolve through the interplay of numerous processes, but aside from lateral movements much of the observed variability in morphology can be related to evolution of ductility in the deeper levels of the subduction complex. In the eastern Aleutians, Lesser Antilles, Makran, and Cascade arc trench systems a 50- to 200-km-wide forearc ridge is developed along the inboard edge of the subduction complex. These forearc ridges did not form until subduction accretion had expanded the arc trench gap to 275-300 km and the near vertical rise of the ridge occurred 50 km or more from the trench slope break; the forearc high apparently maintained by accretion at the trench. Thus these broad forearc ridges are not emergent trench slope breaks; the process responsible for uplift is occurring within the subduction complex, and the size of the accreted mass is apparently a major factor. Rheological models assuming frictional sliding laws at shallow levels and power law rheologies at depth predict different behaviors for various parts of a "typical" large subduction complex. The older forearc basement beneath which the inboard part of the subduction complex is emplaced represents a rigid, brittle massif that extends 100-150 km from the volcanic arc, a prediction supported by seismicity studies in modern convergent margins. Because of the wet, quartz-rich lithologies of the subduction complexes, however, the brittle-to-ductile transition apparently occurs at depths of 10-20 km within the accreted mass. Thus in large subduction complexes where the downgoing slab is 40-50 km beneath the inboard edge, a significant region at the deeper levels of the subduction complex is apparently capable of flow. The predicted zone of ductile deformation is directly beneath the area in which a forearc ridge is generally developed; hence we conclude that the broad structural highs of large subduction complexes are dynamically maintained by deep-seated flow. The character of this flow is uncertain, yet it is likely that the scripping of low-viscosity, partially subducted sediments plays a role, and the volume of sediments added by underplating may be the controlling factor to the dynamic uplift of broad forearc ridges. Kinematically, the flow could be a pure shear deformation induced by subhorizontal loading, but we prefer the familiar "corner flow" mechanism because it provides the simplest explanation for the observations. The interaction between offscraping at the trench and underplating affects the distribution of mass on the downgoing slab and probably controls uplift rates in broad forearc ridges. Because of the complexity of the interaction and the observation that modern forearc ridges appear to be rising slowly, we conclude that high-pressure rocks are only exposed in unusual forearc systems, e.g., systems with either a prolonged period of uplift or large influxes of deep underplated sediment. The evolution of ductility plays a major role in the development of forearc morphologies. When the subduction complex is small, brittle deformation and processes related to accretion at the trench dominate and the "classic" growth models are applicable. However, as continued growth of the subduction complex depresses the downgoing lithosphere and increases the arc trench gap, the subduction complex becomes ductile at depth, and ultimately, deep-seated flow leads to abrupt uplift along the inboard edge of the subduction complex.
Tectonics, Paper 3T1123



News

Energy and Air Quality

Many coal, oil shale, and geothermal energy sources are located in areas where atmospheric transport and dispersion processes are dominated by the complexity of the terrain. The U.S. Department of Energy (DOE), responsible for developing new energy technologies that meet air-quality regulations, developed a program aimed specifically at Atmospheric Studies in Complex Terrain (ASCOT) in 1978. The program uses theoretical atmospheric physics research, mathematical models, field experiments, and physical models. The goal is to develop a modeling and measurement methodology to (1) improve fundamental knowledge of transport and dispersion processes in complex terrain and (2) build on this improvement to provide a methodology for performing air quality assessments. The ASCOT team, managed by Marvin Dickerson and Paul Gudiksen of Lawrence Livermore Laboratory, Livermore, Calif., is composed of scientists from DOE-supported research laboratories and university programs.

The initial ASCOT study site, the Geysers geothermal area in northern California, was chosen for the following reasons: (1) The electrical power generating capacity of the Geysers is undergoing extensive expansion and the impact of this development requires further air quality assessment. (2) Power plant cooling towers and geothermal wells located on the mountain ridges and slopes and in valleys release a variety of emissions such as carbon dioxide, hydrogen sulfide, methane, ammonia, radon gas, arsenic, boric acid, mercury, and other trace materials. A current environmental issue is the release of hydrogen sulfide and its transport to surrounding communities and agricultural areas. (3) Nocturnal drainage winds and synoptic-mesoscale winds can transport the Geysers effluents into other valleys. (4) Cooperation and interest was shown by state and local governments and by industry. (5) There is a data base on the area's air quality and meteorology.

The ASCOT multilaboratory program conducted intensive field measurement programs in the Anderson Springs–Putah Creek area of the Geysers during July 14–28, 1979, and September 11–25, 1980. Focusing on the role that nocturnal drainage winds play in transporting and dispersing potential effluents to the surrounding areas, the studies were divided into meteorological measurements and tracer experiments.

A third field experiment was conducted during August 12–24, 1981, in the Big Sulfur Creek area of the Geysers and Anderson-Putah-Cobb valley areas. Their purpose was to collect the data needed to evaluate models of plume-rise from cooling towers and models of atmospheric hydrogen sulfide transport and dispersion. The field experiments were again divided into meteorological measurements and tracer experiments.

To develop its models, ASCOT begins with models that exist at the various participating laboratories, determines their applicability to the study of nocturnal drainage winds and, if appropriate, uses them to develop a spectrum of modeling capabilities from one- to three-dimensional. New models have been developed and all have been classified into three types: (1) hydrodynamic, (2) statistical, and (3) transport and diffusion. Two- and three-dimensional simulations of the 1980 tracer experiments have been produced, but evaluation of these results is still in progress.

ASCOT is considering the Brush-Roan Creek area of western Colorado as a candidate for the primary study site for the next several years. Exploratory field experiments were conducted there between July 26 and August 7, 1983, including two experiments at valley scale, one at multivalley scale, and one at regional scale. These studies were primarily concerned with measurements of the temporal and spatial variations of the surface and upper-air wind and temperature structure covering the three spatial scales of interest throughout the complete diurnal cycle. The meteorological measurement systems included tethersondes, airsondes, optical anemometers, acoustic sounders, and surface meteorological stations.

At the same time as the ASCOT experiments at Brush-Roan Creek area, the U.S. Environmental Protection Agency's Green River Ambient Model Assessment (GRAMA) program conducted sulfur hexafluoride (SF_6) tracer dispersion studies within the Brush Creek valley. The tracer releases were initiated during the nocturnal drainage period and continued through the morning transition period until the establishment of daytime upslope and upvalley flows. Surface concentration patterns were defined by a network of surface samplers located along the valley slopes and axis. Vertical profiles of tracer concentrations were acquired by balloon and aircraft sampling systems. In addition to the GRAMA experiments, DOE-sponsored deposition studies were also conducted in Brush Creek valley using SF_6 and lithium particle tracers.

ASCOT plans to publish a progress report in early 1984 describing the Geysers data analysis and results. Several ASCOT participants have had individual contributions published in various journals. A more extensive field experiment in the Brush-Roan Creek area is planned for 1984.

This news item was contributed by M. M. Orgill *and* J. M. Thorp *of the Pacific Northwest Laboratory, Richland, WA 99352.*

Editorial

AGU and Nuclear War

The potential involvement of AGU in proper scientific discussion of geophysical questions relating to nuclear war and nuclear weapons on the earth and in space is being considered by a special subcommittee of the AGU Committee on Public Affairs.

In these areas of very high public and governmental concern, AGU clearly has the most directly related scientific expertise of any major scientific society. Since geophysical science is critically relevant to public discussion and policy in these issues, AGU may have a responsibility to contribute. We may at least want to inform ourselves on the science that is being done.

The National Academy of Sciences and the Council of the American Physical Society have each adopted resolutions this year deploring nuclear war and urging the nuclear nations to substantially intensify negotiations on nuclear arms agreements. (See the March and May 1983 issues of *Physics Today*.) However, the AGU Committee on Public Affairs feels that any AGU activity should be clearly focused on scientific contributions and that a resolution is not a good idea for us. In fact, the committee feels that the statement on advocacy adopted by the AGU Council in May 1982 (*Eos*, August 3, 1982, p. 488) is the best guide to our responsibility and to the sort of things we might do:

"*Advocacy and the American Geophysical Union*

"The American Geophysical Union is an association of scientists, scholars and interested lay public for the purpose of advancing geophysical science. The Union shares a collateral sense of responsibility to assure that the results of geophysical research are made available to benefit all mankind. The Union encourages its members to exercise their individual senses of responsibility in addressing political and social issues. Should they choose to act collectively on such issues, other organizational bases exist for such purposes.

"The American Geophysical Union, as a society, should preserve its unique position as an objective source of analysis and commentary for the full spectrum of geophysical science. Accordingly, the following policies should guide the American Geophysical Union's role as an advocate:

"The American Geophysical Union has a responsibility to its members to adopt a position of advocacy on geophysical science issues based on their intrinsic merits and needs.

"To the extent that the understanding and application of geophysical science is relevant to public policy, AGU as a responsible scientific association should make relevant information available to all parties interested in the issue.

"As a scientific society AGU should not take or advocate public positions on judgmental issues that extend beyond the range of available geophysical data or recognized norms of legitimate scientific debate. Public positions adopted by AGU and statements issued on its behalf must be based on sound scientific issues and should reflect the interests of the Union as a whole."

Union symposia at our national meetings seem to be the easiest way to bring the AGU expertise together to "make relevant information available" in the current geophysical science of nuclear weapons and war. Accordingly, for the 1983 AGU Fall Meeting in San Francisco, Joseph V. Smith (University of Chicago) and Thomas J. Ahrens (California Institute of Technology) have organized a morning Union session of review talks on Geophysical and Geochemical Consequences of Nuclear Explosions for Wednesday, December 7, followed in the afternoon by a session of specialized talks emphasizing the atmospheric effects.

We believe these will be landmark sessions. We hope that as many members as possible attend them and consider the AGU role in this science.

Were do we go from there? Further special programs? Workshops? Publications? The AGU Ad-Hoc Subcommittee on Geophysical Aspects of Nuclear War and Arms Limitation (Miriam A. Forman, Stamatios M. Krimigis, George Paulikas, Joseph V. Smith, Lynn Sykes, Martin Walt, and Jared Cohon, chairman) is charged to determine what role AGU should play in the ongoing debates about the geophysical science of nuclear weapons and war, and what we should do. How can AGU help us all best contribute as individual scientists and as a Union to this extremely important public discussion of a topic having a strong geophysics aspect?

Since this is such an important and sensitive issue and is new territory for most of us, we are asking all the members for their suggestions. Please write to us.

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Stamatios M. Krimigis
Applied Physics Laboratory
Johns Hopkins University
Laurel, MD 20707

For the AGU Committee on Public Affairs

Earth Science Ph.D.'s Up 13%

While the total number of research doctorates awarded in the United States in 1982 was down slightly from 1981, the number of such doctorates awarded in the earth, environmental, and marine sciences (EEMS) rose nearly 13% according to a recent document from the National Research Council.

The 31,048 research doctorates awarded by U.S. universities in 1982 is down from the 31,342 awarded in 1981. The number of EEMS doctorates awarded in 1982 was 657, up from 582 in 1981 (*Eos*, August 10, 1983, p. 506).

The total number of women receiving doctorates in all fields in 1982 increased to 10,057, passing the 10,000 mark for the first time, according to the *Summary Report 1982: Doctorate Recipients from United States Universities*, published by the National Academy Press. The largest increases in the number of women Ph.D.'s occurred in the physical and life sciences. Data for the report was compiled by the National Research Council for the National Science Foundation, the U.S. Department of Education, the National Institutes of Health, and the National Endowment for the Humanities.

Of the 657 EEMS doctoral degrees awarded in 1982, 554 went to men. About 80% of these EEMS Ph.D. recipients were U.S. citizens and nearly two-thirds were married. The median age at which the EEMS class of 1982 (men and women) received their doctorates was 30.8 years; the median time from baccalaureate to doctorate was 8.3 years (total time), with 6.4 years as the median time as a registered student.

Like their 1981 colleagues, women receiving EEMS doctorates in 1982 showed a lower median age (29.8 years) than their male classmates (30.9 years). In 1981 the median age at doctorate of women (29.94 years) and men (31.06 years) was higher than in 1982.

The two fields within EEMS conferring the most doctorates in 1982 were oceanography and solid earth geophysics; the two fields granting the fewest were atmospheric physics and chemistry and geomorphology and glacial geology (see Table 1). The 1981 tally showed the same result.

One-quarter of the EEMS graduates planned to get a postdoctoral position; nearly 20% had definite postdoctoral arrangements. Nearly 70% planned to get a job, but only 55% had definite commitments from employers.—*BTR*

TABLE 1. Earth, Environmental, and Marine Science (EEMS) Doctorates Awarded

Field of Doctorate	1980 Total	1981 Total	1982 Total	1982 Men	1982 Women
Applied geology	27	21	25	23	2
Atmospheric dynamics	20	27	22	10	3
Atmospheric physics & chemistry	19	15	17	17	0
Atmospheric sciences, other	51	31	26	25	1
Earth sciences, general	48	46	39	34	5
Earth sciences, other	21	10	29	23	6
Environmental sciences, general	15	30	22	17	5
Environmental sciences, other	25	24	31	25	6
Geochemistry	51	48	51	43	8
Geomorphology & glacial geology	15	13	21	15	6
Geophysics (solid earth)	71	72	80	74	6
Hydrology & water resources	27	21	24	21	3
Marine sciences	25	30	41	32	9
Mineralogy, petrology	47	30	41	33	8
Oceanography	85	70	92	78	14
Paleontology	21	19	24	17	7
Stratigraphy, sedimentation	40	42	47	39	8
Structural geology	20	27	25	19	6
Total, EEMS	628	582	657	554	103

Source: National Research Council.

Underground Lab Proposed

There is a new effort to spend more than $45 million for the construction of an underground national laboratory, this time for the purpose of observing natural phenomena, but of course with a high-energy physics overtone. To be observed are phenomena such as the gravitational constant and the earth's natural neutrino flux. This is to be a project in the realm of "non-accelerator physics" and as such will be breaking new ground in federal big-science funding.

The idea is to locate an elaborate facility for testing a number of very basic physical theories. The laboratory is to be located underground at a depth of 1–2 km at the Nevada Test Site. The area selected will be free from surface background effects and will benefit from "plenty of land, where the geology is thoroughly understood" according to a recent report (*Science*, August 26, 1983).

The Los Alamos National Laboratory is supporting the project and can offer geological support, according to the *Science* report: "Los Alamos, as it happens, is itself strong in the geophysical arts. The laboratory has long been involved in developing an underground nuclear waste disposal facility."

A new, well-supported facility may, for example, take geophysicist Raymond Davis from his damp tunnel at the Homestake Goldmine in South Dakota to a much-improved experimental site. Davis has been working with others from the Brookhaven National Laboratory for more than 10 years at the Homestake Mine to obtain usable values of the neutrino flux which originates in the sun.

The flux, it is now known from these measurements, has turned out to be considerably smaller than that calculated from models of the sun's hydrogen fusion reaction. Either the sun has different reactions or composition than now understood, or else the Homestake experiment is not sufficiently sensitive to the actual flux.

The experiment now is to monitor the argon-37 produced by the high-energy neutrino + chlorine-37 reaction in a large tank of chlorinated dry cleaning fluid. Apparently, the low-energy neutrino flux, if it can be accurately determined, could provide a more direct measurement. The low-energy measurements would involve the neutrino + gallium-71 reaction to yield germanium-71. This measurement would be costly: "The scale of the experiment is certainly worthy of a national facility . . . fortunately it [the germanium] could be resold at the completion of the experiment."

Measurements of cosmic-ray induced and other high-energy neutrinos could be done in the new facility with a neutrino detector that, in the manner of a telescope, could pinpoint their source within a few degrees. Neutrinos could be observed in order to look for differences between those that travel the short distance through rock at the Nevada Test Site and those that pass completely through the earth.

Locating gravity-measurement devices underground at the Nevada Test Site is desirable in order to avoid "mass contamination." At the surface, mankind moves too many objects. The "National Underground Science Facility," as it proposed by the Los Alamos National Laboratory, would house a number of delicate instruments to measure the gravi-

News (cont. on p. 586)

News *(cont. from p. 585)*

tational constant and to test the inverse-square law.

It is not clear that the U.S. Department of Energy will be able to fund the new facility, but the possibility exists. Experiments will be done to attempt the observation of nucleon-decay chains, which are predicted by the grand, unified theories of physics. That all of these long-term, fundamental measurements will be able to survive funding competition against the current round of "accelerator physics" proposals is in doubt.—*PMB*

Naval Research Fellowships

The American Society for Engineering Education (ASEE) is seeking applicants for 40 fellowships that will be awarded by the Office of Naval Research (ONR) in 1984. This program is designed to increase the number of U.S. citizens doing graduate work in such fields as ocean engineering, applied physics, electrical engineering, computer science, naval architecture, materials science, and aerospace and mechanical engineering. The fellowships are awarded on the recommendation of a panel of scientists and engineers convened by the ASEE. The deadline for applications is February 15, 1984.

The program is open to graduating seniors who already have or will shortly have baccalaureates in disciplines vital to the research aims of the Navy and critical to national defense. As a reflection of the quality of the program, 1983 fellows had an average cumulative grade point average of 3.88; nine had a perfect 4.0.

Each fellow will receive an annual stipend of $12,500, and the ONR will pay tuition and fees and provide $2,000 to the department in which the fellow will pursue graduate studies. The Navy also encourages fellows to conduct research at its laboratories during the summer.

For more information about the program contact John Lisack, Jr., Director, Membership, Projects, and Federal Relations, The American Society for Engineering Education, Suite 200, 11 Dupont Circle, Washington, DC 20036 (telephone: (202)293-7080).

ICSU Press

The International Council of Scientific Unions (ICSU) has established a publishing arm called ICSU Press. The Press is intended to complement the publishing activities of its member scientific unions in several ways: Initiate special publications of research findings and new journals of reviews or research; advise, or act as publishers for, members requesting such service; and engage in copublishing ventures with international bodies outside of ICSU whose goals are consistent with ICSU's.

Plans for ICSU Press also include preparation of television programs in cooperation with BBC-2 in Britain and PBS and ABC in the United States.

ICSU, an international, nongovernmental organization founded in 1931, is composed of 20 international scientific unions (including AGU), 66 national members, and 17 scientific and 4 national associates. Further information may be obtained from F. W. G. Baker, Executive Secretary, ICSU, 51 Boulevard de Montmorency, 75016 Paris, France.

Geophysical Events

This is a summary of *SEAN Bulletin*, 8(8), August 31, 1983, a publication of the Smithsonian Institution's Scientific Event Alert Network. The complete Mount St. Helens, Macdonald, Teahitia, and Pumice Raft reports are included; the earthquake report is an excerpt. The complete bulletin is available in the microfiche edition of *Eos* as a microfiche supplement or as a paper reprint. For the microfiche, order document E83-009 at $2.50 (U.S.) from AGU Fulfillment, 2000 Florida Avenue, N.W., Washington, DC 20009. For the paper reprint, order *SEAN Bulletin* (giving volume and issue numbers and issue date) through AGU Separates at the above address; the price if $3.50 for one copy of each issue number for those who do not have a deposit account, $2 for those who do; additional copies of each issue number are $1. Subscriptions to *SEAN Bulletin* are available from AGU Fulfillment at the above address; the price is $18 for 12 monthly issues mailed to a U.S. address, $28 if mailed elsewhere, and must be prepaid.

Volcanic Events

Una Una (Indonesia): Continued explosive activity seen on satellite images; numerous magnitude 5 earthquakes
Iliboleng (Indonesia): Small plume photographed by Space Shuttle astronauts
Iliwerung (Indonesia): Submarine explosions
Tangkuban Parahu (Indonesia): Increased seismicity; thermal activity; inflation
Kilauea (Hawaii): 7th, 8th, and 9th major episodes produce lava flows extending NE and S from spatter cone
Mt. St. Helens (Washington): Lava extrusion continues; internal dome growth accelerates; small fluidized avalanches; vapor and ash plumes
Okmok (Aleutians): Possible eruption plume on satellite imagery
Veniaminof (Alaska): Lava flow and ash emission stop; tremor summarized
Macdonald (S-central Pacific): Renewed submarine activity
Teahitia (French Polynesia): Shallow earthquakes and high-frequency tremor
Pumice Raft (S Pacific): Pumice in the Tuamoto Archipelago; source unknown
Pagan (Mariana Is.): Ash cloud seen from aircraft
Langila (New Britain): More, stronger explosions; ashfalls to 10 km
Manam (Bismarck Sea): Emissions increase slightly; B-type events continue
Ruapehu (New Zealand): Upwelling in crater lake; slight inflation
Etna (Italy): No new activity; addition to last month's figure caption
Atmospheric Effects: June-July balloon data show new layers near tropopause; only El Chichón aerosols detected by lidar in August

Kilauea Volcano, Hawaii, USA (19.42°N, 155.27°W). Correction: In the *Eos* summary of the June 30, 1983, *SEAN Bulletin* (*Eos*, August 9, 1983, p. 500), the rate of SO_2 emission on June 30 and July 1 was incorrectly reported as 7200 metric tons per day. The correct figure is 8000 metric tons per day.

Mt. St. Helens Volcano, Cascade Range, S Washington, USA (46.20°N, 122.18°W). Until February 1983, growth of the composite lava dome had occurred in a series of brief extrusion episodes, preceded by several weeks of increasingly rapid internal dome growth that stopped suddenly when lava reached the surface. However, internal growth did not cease with the onset of the February extrusion episode (see *SEAN Bulletin* v. 8, nos. 1–5); it continued as spines were extruded in April, and a new lobe emerged onto the dome's NE flank about May 1. New lava was still being added to this lobe in early September and deformation of other parts of the dome was accelerating.

The front of the active lobe moved down the NE flank at about 1 m per day in August, roughly the same rate as in July. Rockfalls from the lobe's leading edge appeared to decline in July and August but continued to remove some material, reducing the lava's net August advance to 20–25 m.

Rates of outward movement of survey targets on the S, SE, and N flanks of the dome began an irregular increase about July 8 and by early September had reached nearly 11 cm per day high on the S side. No acceleration of endogenous growth was observed in the area of most rapid deformation, below the active lobe on the NE flank, where rates averaged 60 cm per day. Movement of crater floor stations N and S of the dome was first detected around early August, gradually increasing into the millimeters-per-day range by early September. The pattern of increasing deformation was generally similar to periods that preceded extrusion of new lobes in 1981 and 1982. However, Donald Swanson noted that the irregular acceleration of endogenous growth contrasted with the quite steady increases measured before 1981–1982 extrusion episodes and that it was continuing after 2 months without the onset of new extrusion, exceeding the typical 1 month–6 week durations of the 1981–1982 premonitory periods.

Numerous rockfalls, some quite large, occurred from a N flank notch that was propagating upslope toward the dome's extrusive vent. This activity built a large, structurally unstable talus slope of hot blocks. Upon reaching the talus, some rockfalls became fluidized, probably by entrainment of heated air from between talus boulders. Early August 12, Daniel Dzurisin observed a group of large boulders from the notch bounce onto the talus. A few seconds later, a second rockfall reached the talus and fluidized. An ash cloud quickly formed over the avalanche and moved downslope at the same speed as the entrained boulders, stopping as they came to rest. The avalanche formed a lobate deposit with marginal levees ≤1 m high. Fine particles extended to roughly the distal end of the boulder deposit. Ash clouds formed by smaller avalanches were diffuse enough so that boulders could be seen rolling slowly downslope; these avalanches seemed to be only partially fluidized. The avalanches traveled no more than several hundred meters beyond the base of the talus, into the large breach on the N side of the crater. For several days after a large rockfall, avalanches occurred roughly every 2 hours, but declined to 1–2 per day during quiet periods.

Occasional ejection of steam and ash plumes continued from several vents in the broad summit region of the dome. The number of plumes varied from day to day but generally ranged from 3 to 6 daily and remained relatively unchanged through the summer. Plumes typically rose about 1 km above the dome, and deposits were usually limited to the area of the dome's summit. No projectiles from these plumes reached the crater floor in August. Tom Casadevall reported that COSPEC measurements indicate that the volcano emits more SO_2 while plumes are being ejected than during quiet periods; on August 18 a plume briefly produced a 4-fold increase in SO_2 emission. However, plume events normally last only 15–20 minutes, and the excess SO_2 values decay exponentially, so they do not have a large effect on daily gas flux. The rate of SO_2 emission averaged 70 ± 50 metric tons per day in August, ranging from 40 to 90 tons per day most of the month, but measurements between August 18 and 23 yielded values of more than 150 tons per day.

August seismic activity was generally similar to that of July. A substantial increase in surface events was recorded, but was thought to reflect increased avalanching from the crater walls as warm weather melted snow on the rim. For about 10 days in late August the number of earthquakes and the rate of seismic energy release increased slightly but declined to previous levels by early September.

Information Contacts: Tom Casadevall, Daniel Dzurisin, and Donald Swanson, USGS Cascades Volcano Observatory, 5400 MacArthur Blvd., Vancouver, WA 98661 USA; Steven Malone, Geophysics Program, University of Washington, Seattle, WA 98195 USA.

Macdonald Seamount, south-central Pacific Ocean (28.98°S, 140.25°W). In May, the Réseau Sismique Polynésien recorded seismicity from renewed eruptive activity at Macdonald. Its eight previous eruptions had begun with explosive events, but the May activity did not and probably was a continuation of the March eruption (see *SEAN Bulletin*, v. 8, no. 4). Reconnaissance by a Marine Nationale Française vessel did not show a perceptible increase in the volcano's summit altitude since the bathymetric survey of February 1982. Macdonald was discovered after hydrophones recorded sounds accompanying an eruption on May 29 1967.

Information Contact: J. M. Talandier, Directeur, Laboratoire de Géophysique, Commissariat à l'Energie Atomique, B.P. 640, Papeete, Tahiti, Polynésie Française.

Teahitia Volcano, Society Islands, French Polynesia, S Pacific Ocean (17.57°S, 148.86°W). Between July 11 and 20, the Réseau Sismique Polynésien (RSP) recorded 5,000–4,000 shallow earthquakes at Teahitia, accompanied by high-frequency volcanic tremor. Teahitia, a seamount with a summit about 2 km below sea level, was the site of strong seismicity associated with a submarine eruption detected by the RSP in March-April 1982 (see *SEAN Bulletin*, v. 7, no. 4).

Information Contact: Same as for Macdonald.

Pumice raft, S Pacific Ocean. While traveling E of the Kermadec Islands on April 6, Captain J. McInnis of the yacht *Cuckoo's Nest* encountered a roughly 1-hectare area of small pieces of pumice at 27.58°S, 177.40°E, in which he noted some bubbling but no smells (see *SEAN Bulletin*, v. 8, no. 4). The source of the pumice remains unknown. Analysis of March and April records from the Réseau Sismique Polynésien (RSP) revealed no acoustic waves (T-phase) from eruptions other than that of Macdonald Seamount (see *SEAN Bulletin*, v. 8, no. 4). However, the numerous small islands in the area of the Kermadecs, Tonga, Samoa, and Fiji interfere with acoustic waves, preventing effective T-phase monitoring of volcanic activity in some parts of the S Pacific. J. Talandier notes that measurements of surface currents in French Polynesia and similar latitudes suggest that pumice from Macdonald should drift eastward, away from the April 6 site.

Pumice came ashore at both the SE and NW ends of the Tuamotu Archipelago, on the Gambier Islands (23.15°S, 134.97°W), and at Rangiroa (15.00°S, 147.67°W), 4800 km E and 3900 km ESE of the April 6 observation. No information on the amount of pumice or the date of its arrival at these locations was available. Talandier noted that Rangiroa is very remote from known active volcanoes other than those in the Mehetia region, where eruptions occur at depths that are too great for production of pumice.

Information Contact: Same as for Macdonald.

Earthquakes

Date	Time (UT)	Magnitude	Latitude	Longitude	Depth of Focus	Region
August 6	1544	$7.1M_s$	40.09°N	24.73°E	10 km	N. Aegean Sea
August 8	0348	$5.8M_s$	35.47°N	138.91°E	49 km	Honshu, Japan
August 17	1056	$6.5m_b$	55.67°N	161.51°E	120 km	Kamchatka, USSR
August 17	1218	$6.7M_s$	18.13°N	121.05°E	shallow	Luzon, Philippines

Information Contact: National Earthquake Information Service, U.S. Geological Survey, Stop 967, Denver Federal Center, Box 25046, Denver, CO 80225 USA.

Meteoritic Events

Fireballs: W, E Australia; SW England; North Sea; W Europe; Colorado, Kansas, mid-Atlantic, Montana, Texas, USA.

Recent Ph.D.'s

Eos periodically lists information on recently accepted doctoral dissertations in the disciplines of geophysics. Faculty members are invited to submit the following information, on institution letterhead, above the signature of the faculty advisor or department chairman: the dissertation title, author's name, name of the degree-granting department and institution, and month and year degree was awarded. If possible include the current address and telephone number of the degree recipient (this information will not be published).

Geochemistry

Thermodynamic Analysis of the Systems $CaCO_3$-$MgCO_3$ and FeO-$FeTiO_3$, Benjamin Burton, Dept. of Earth and Space Sciences, State Univ. of New York, Stony Brook, June 1983.

Ocean Sciences

Atmospheric Interactions with Gulf Stream Rings, William K. Dewar, Joint Program in Oceanography and Oceanographic Engineering, WHOI/MIT, February 1983.

A Continental Shelf Bottom Boundary Layer Model: The Effects of Waves, Currents, and a Moveable Bed, Scott M. Glenn, Joint Program in Oceanography and Oceanographic Engineering, WHOI/MIT, February 1983.

Late Paleogene (Eocene to Oligocene) Paleoceanography of the Northern North Atlantic, Kenneth G. Miller, Joint Program in Oceanography and Oceanographic Engineering, WHOI/MIT, February 1983.

The Numerical Synthesis and Inversion of Acoustic Fields Using the Hankel Transform with Applications to the Estimation of the Plane Wave Reflection Coefficient of the Ocean Bottom, Douglas R. Mook, Joint Program in Oceanography and Oceanographic Engineering, WHOI/MIT, February 1983.

Stable Isotope Geochemistry of Nitrogen in Marine Particulates, Susan M. Libes, Joint Program in Oceanography and Oceanographic Engineering, WHOI/MIT, February 1983.

An Improved Loran-C Drifting Buoy and Drogue for Coastal Applications, William J. Burke, Joint Program in Oceanography and Oceanographic Engineering, WHOI/MIT, June 1983.

Inverse Methods and Results from the 1981 Ocean Acoustic Tomography Experiment, Bruce D. Cornuelle, Joint Program in Oceanography and Oceanographic Engineering, WHOI/MIT, June 1983.

Books

Water and Western Energy: Impacts, Issues, and Choices

Stud. in Water Policy and Management, vol. 1, S. C. Ballard and M. D. Devine et al., Westview Press, Boulder, Colo., xxix + 321 pp., 1982, $27.50.

Reviewed by Yacov Y. Haimes

Since the 1973 oil embargo numerous studies have been commissioned on the subject of water and energy, and thus the proliferation of books and reports on associated problems is not surprising. The importance of the issues at stake and the realization that we were relatively unprepared to deal with the anticipated high level of future coal and shale development in the West altered our perceptions of many water-energy issues: the issues were elevated, at least in some quarters, from the level of a common planning problem to the level of a crisis. For those of us who were captured in this syndrome and were a part of these "crisis studies," this document inescapably brings a sense of déja vu.

The review of books serves multiple goals and purposes for readers as well as authors. For example, when I read book reviews in *Eos*, I am most interested in one that briefly introduces the book's topics, indicates the depth and breadth of the discussion, constructively highlights the major attributes and limitations of the book, critically evaluates the book as a whole, and, if possible, suggests other documents that either supplement or complement the book's writings. I will attempt to do just this.

Water and Western Energy is a summary of a series of studies on the subject conducted by the authors for the U.S. Environmental Protection Agency during the late seventies. The studies were focused on the following premise:

> Water availability and quality will be among the most critical problems associated with expanded western energy development. Although water has always been scarce in the West, enough has generally existed to provide supplies to a substantial number of users, primarily irrigated agriculture and municipalities. However, the central question regarding future development of the region is whether or not enough water exists to support traditional users and the growing demands of energy development, other industrial development, defense installations, Indians, environmental interests, and others.

Throughout the book, the following issues and policy alternatives have been addressed.

Issues: Water requirements for energy development, pollution from energy facilities, increasing demands for water use, reserved water rights, the uncertainty and complexity of the water policy system, and salinity control.

Policy alternatives: Water conservation, augmentation of supply, water quality protection, administration and management at the state level, and regional and federal roles.

The breadth of the topics studied and the complexities involved in the formulation of water resource policies that are responsive to regional differences, sectoral competition for water, institutional constraints and opportunities, socioeconomic considerations, environmental protection, and political coalitions necessitate a rather shallow discussion of the issues. Indeed, the book provides a comprehensive overview of the problems associated with water and energy development in the western part of the country. Thus, as a compact compendium of statistical data and other valuable basic information concerning the interplay between water and energy, the book can be very helpful and useful. On the other hand, the efficacy of the substantial effort spent by the authors on the development of alternative policy options cannot be fully appreciated by the reader (at least this reader) for the following two reasons.

First, the alternative policy options formulated during the study (and documented in this book) are not adequately analyzed in terms of their impacts. Consequently, these options lose much of the value in terms of understanding their genesis, rationale, and associated trade-offs. Second, the alternative policy options were formulated during the Carter administration—an era markedly different from the present one—so that many of the policies discussed in the book are of a somewhat academic nature and suffer from a lack of relevance to the world of today. The reference in the book to the Office of Water Research and Technology—which has been abolished in the meantime by Secretary of the Interior James Watt—is a case in point.

The book is rich in valuable summary tables, and, although it is written by 10 coauthors, it reads very smoothly. The authors should be complimented on producing a unified document on diverse and complex subjects. Finally, the impressive list of references should be most valuable to those interested in pursuing the subject further. Other related reports on the subject include the following documents:

U.S. Department of Energy, *Institutional Constraints on Alternative Water for Energy*, DOE/EV/10180–1, November 1980.

U.S. Department of Energy, *Water Supply and Demand in an Energy Supply Model*, DOE/EV/10180–2, December 1980.

U.S. Department of Energy, *Water Quality Issues and Energy Assessment*, DOE/EV/10154–1, November 1980.

U.S. Department of Energy, *Ground Water and Energy*, CONF-810137, November 1980.

U.S. Department of Energy, *Water Related Planning and Design at Energy Firms*, DOE/EV/10180–1, November 1980.

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Cover. Time-integrated photographs of steam plumes from multiple-cell power plant cooling towers at the Geysers geothermal area in northern California. The 300-second exposures, which portray mean plume rise and boundaries, were one phase of a series of experiments conducted in August 1981 as part of a continuing program of Atmospheric Studies in Complex Terrain (ASCOT) sponsored by the U.S. Department of Energy. Left to right, the photographs show examples of tall and short steam plumes: (top) late at night from a cooling tower located in a narrow valley and (bottom) during the afternoon from a similar tower located high on a ridge crest. (See news item, this issue.) [Photos by J. M. Thorp and D. W. Glover, Pacific Northwest Laboratory, Richland, WA 99352.]

New Publications

Items listed in New Publications can be ordered directly from the publisher; they are not available through AGU.

Conservation of Water and Related Land Resources, P. E. Black (Ed.), Praeger, xx + 209 pp., 1982.

The Solar Spectrum, From the Echelle Spectrograph Flown in 1961 and 1964, C. E. Moore, R. Tousey and C. M. Brown (Eds.), Naval Res. Lab., Washington, DC, vi + 160 pp., 1982.

Structure and Development of the Greenland-Scotland Ridge: New Methods and Concepts, M. H. P. Bott, S. Saxov, M. Talwani, J. Thiede (Eds.), Plenum Press, New York, x + 685 pp., 1983, $85.

Surface Mining Environmental Monitoring and Reclamation Handbook, L. V. A. Sendlein, H. Yazicigil, C. L. Carlson, and H. K. Russell (Eds.), xv + 750 pp., Elsevier, New York, 1983, $85.

Correction The following book was incorrectly listed in the September 13, 1983, issue of *Eos*:

Short Period Climatic Variations: Collected Works of J. Namias, vol. 3, 1075–1982, University of California, San Diego, Graphics and Reproduction Services, x + 393 pp., 1983, $8.

Classified

Iowa State University of Science and Technology, Department of Earth Sciences. Applications are invited for a tenure track faculty position in Meteorology. Rank is at the assistant or associate professor level, dependent upon qualifications. The successful applicant will be expected to develop a strong research and graduate program and will teach undergraduate and graduate courses for meteorology majors.

The position is for a person with proven expertise within the general area of dynamic meteorology. Teaching will involve an undergraduate course in synoptic meteorology, in addition to courses related to the field of expertise. Completion of the Ph.D. prior to appointment is strongly preferred. In addition, research ability shown by other publications and/or postdoctoral experience will be an advantage.

Iowa State offers degrees in meteorology through the Ph.D. The program includes about 60 undergraduate majors; the graduate/research program is strong and emphasizes theoretical, dynamic studies. Close relationships are established with the facilities and personnel of major national laboratories. New campus facilities for meteorology are currently under construction.

The appointment is expected to begin no later than September, 1984; an appointment during the current academic year may be possible. Application deadline is November 1, 1983; later applications will be accepted if the position is not filled. For application information please write to:

Dr. Bert E. Nordlie
Department of Earth Sciences
Iowa State University
253 Science I
Ames, Iowa 50011.

Iowa State University is an equal opportunity/affirmative action employer.

Laboratory Analyst and Manager/South Dakota School of Mines and Technology. Position as acting Assistant Director of Engineering and Mining Experiment Station at state-supported school of engineering and science located adjacent to the Black Hills. Experience required in standard chemical analysis, XRF, XRD, AA (ICP), ES, and energy dispersive wavelength techniques. Analytic work dominantly in ores, minerals, fuels and water but includes engineering materials. Opportunity for individual research, work with graduate students, and instruction in short courses. M.S. degree minimum. Closing date, October 31, 1983.

An Equal Opportunity Employer.

Resume and three references to Jack A. Redden, Director, Experiment Station, South Dakota School of Mines and Technology, Rapid City, SD 57701-3995.

Reflection Seismologists or Geologists. Bored by oil? BIRPS—academic seismic profiling at sea to 15 seconds—seeks postdocs for geological interpretation and innovative processing. Splendid environment. University salary. Send c.v. to Dr. Matthews, Earth Sciences, Bullard Labs, Cambridge University, England.

Geochemistry/University of Illinois at Urbana-Champaign. The Department of Geology invites applicants for a tenure-track faculty position in geochemistry. We are seeking candidates who have clearly demonstrated the potential to be outstanding researchers in the general area of low-temperature geochemistry and whose future research efforts will complement our existing programs in the petrology and diagenesis of sediments, stable isotope studies, and fluid-rock interactions. In addition to the development of a strong research program, the successful candidate is expected to participate in all aspects of teaching and advising at the graduate and undergraduate levels.

The Department of Geology houses a variety of facilities for geochemical research including an atomic absorption spectrophotometer, x-ray diffraction and fluorescence units, an isotope-ratio mass spectrometer, and two electron microprobes. Numerous other analytical facilities are available on campus.

This position is available immediately. We expect to make the appointment at the Assistant Professor level. Salary will be commensurate with experience and qualifications. For equal consideration, please submit a letter of application which includes a statement of current and future research interests as well as curriculum vitae, bibliography, and the names of 3 references willing to comment on your qualifications and promise to Thomas F. Anderson, Department of Geology, 245 Natural History Building, 1301 W. Green St., Urbana, IL 61801, (217)333-0355 by November 30, 1983. The University of Illinois is an equal opportunity/affirmative action employer.

Ohio State University/Seismologist-Tectonophysicist. The Department of Geology and Mineralogy, The Ohio State University, invites applications for a tenure-track position for a geophysicist with research interests in seismology and/or tectonophysics. The successful applicant must be prepared to assist in teaching exploration geophysics courses, advanced topics in his/her specialty, conduct research, and supervise graduate students. Preference will be given to candidates with post-doctoral or industrial experience. Rank and salary commensurate with experience and research record. Please send applications or nominations as soon as possible to:

Dr. Ralph R.B. von Frese
Chairman, Search Committee
Department of Geology and Mineralogy
The Ohio State University
Columbus, OH 43210
Phone: (614) 422-1349 or 422-2721

Applications should include a resume, a statement of research interests and the names of at least three persons whom we may contact for recommendations. The closing date for applications is December 23, 1983; appointments will be effective no later than October 1, 1984. Additional information can be obtained by writing or calling the search committee chairman.

The Ohio State University is an equal opportunity/affirmative action employer.

The College of William and Mary/Physics Faculty Position. William and Mary expects to have a tenure-track opening at the assistant-professor level for August, 1984. Preference will be given to applicants in the fields of theoretical plasma physics including computer simulation, nonlinear mechanics, or statistical mechanics. The physics department currently consists of 22 faculty, 7 postdoctoral research associates, and 40 Ph.D. candidate graduate students. Plasma physics funding is currently from NASA and the Department of Energy. Please send vitae and list of three references to: Chairman, Search Committee, Physics Department, College of William and Mary, Williamsburg, Virginia 23185.

William and Mary is an affirmative-action, equal-opportunity employer; women and minority applicants are encouraged to apply.

Oregon State University/Biological Oceanographer. Applications are invited for a 12-month, tenure-track position as Assistant Professor in the College of Oceanography, Oregon State University. The applicant must have demonstrated ability to conduct independent research and obtain research funding in the area of marine zooplankton ecology. Workers with interests in zooplankton ecology, general biology, systematics and/or pelagic ecosystem theory will be considered. Applicant must have a Ph.D. in biological oceanography. Postdoctoral experience desirable.

The appointee will be expected to teach courses in general biological oceanography and in the ecology of marine zooplankton, to supervise graduate students, and to develop a program of grant-funded research. Salary: $27,000-$35,000 negotiable. Application material, including a brief statement of research plans and the names of three references, should be submitted not later than 31 December 1983 to: Dr. C. Ross Heath, Dean, College of Oceanography, Oregon State University, Corvallis, Oregon 97331.

Oregon State University is an Equal Opportunity/Affirmative Action Employer.

University of California/Faculty Appointments. The Department of Geology and Geophysics at the University of California, Berkeley, CA 94720, pending budgetary approval, expects to make two faculty appointments effective Fall 1984, one at the junior level and one at the senior level. Applicants must be interested in pursuing a vigorous research program and in teaching both undergraduate and graduate students. The preferred areas of specialization are sedimentary petrology and sedimentology, stratigraphy and petroleum geology, regional tectonics, geochemistry, economic geology, and metamorphic geology. Applications, including the names of references, should be sent to the Chairman at the above address by January 15, 1984.

The University of California is an Equal Opportunity/Affirmative Action Employer.

Virginia Polytechnic Institute and State University/Petrologist. The Department of Geological Sciences at Virginia Tech invites applications for a tenure-track junior level faculty appointment in Igneous or Metamorphic Petrology. Applicants must demonstrate a strong research record in quantitative petrology; preference will be given to those with experience in the theoretical and experimental aspects of petrology. All faculty members at Virginia Tech are expected to provide quality teaching at the undergraduate and graduate levels, supervise M.S. and Ph.D. theses, and conduct an active program of research and publication.

Applicants should send a letter of application, academic vitae and names and addresses of three references to:

D. A. Hewitt
Department of Geological Sciences
Virginia Tech
Blacksburg, VA 24061

The appointment will begin in September 1984, and candidates are expected to have completed requirements for the Ph.D. by that time. The deadline for receipt of applications is December 15, 1983.

Virginia Tech is an equal opportunity/affirmative action employer.

Louisiana State University/Tenure-Track Faculty Positions in Geology. The Department of Geology is expanding from 15 to 35 faculty with four positions open Fall 1984 and one position (Field Camp Director) open January 1984. Candidates must have the Ph.D. and have active research in progress that might be applied to studies of basins. Specialties of primary interest are field geology, theoretical seismology, hydrogeology, and organic geochemistry; however, other disciplines will also be considered with quality of research being the primary factor in applicant selection. All faculty in the Department are required to conduct research leading to publications and to provide quality instruction. The Department will expand into a new building January 1986.

For consideration send resume, three letters of reference and a description of research to Lyle McGinnis, Faculty Search, Department of Geology, Louisiana State University, Baton Rouge, LA 70803-4101. Search will remain open until positions are filled.

LOUISIANA STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER.

Stanford University/Civil Engineering. The Department of Civil Engineering is seeking candidates for a tenure-track faculty position at the level of Assistant Professor in the area of fluid mechanics starting September 1984. Candidates must have a Ph.D. and some professional experience is desirable. Duties include teaching of undergraduate and graduate courses in fluid mechanics, and development of and participation in independent and team research in fluid mechanics, particularly as it interfaces with problems in environmental engineering and science. Candidates should have training and/or experience in experimental, theoretical, analytical, and numerical fluid mechanics. Particular strength in one of these areas is required.

Stanford University has a strong institutional commitment to diversity. In that spirit, we are particularly interested in receiving applications from women and ethnic minorities. Those interested in filing an application for the position should send a resume, college transcripts, a list of references, and representative publications (if available) to Professor Joseph B. Franzini, Department of Civil Engineering, Stanford University, Stanford, California 94305 by November 30th.

Stanford University is an equal opportunity employer through affirmative action.

Louisiana State University/Chas. T. McCord, Jr. Endowed Professorship in Hydrocarbon Exploration. The Geology Department is seeking an internationally recognized leader in some research specialty critical to the search for oil and gas to fill the Chas. T. McCord, Jr. Endowed Professorship. Applicants are expected to maintain scholarly research in their area of specialty. Rank at Full Professor level with salary competitive with endowed professorships at other major research universities. For consideration send resume, three letters of reference, and a description of future research programs to Lyle McGinnis, Faculty Search, Department of Geology, Louisiana State University, Baton Rouge, LA 70803-4101. Search will remain open until position is filled.

LOUISIANA STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER.

Ohio State University/Structural Geologist. The Department of Geology and Mineralogy, The Ohio State University, invites applications for a tenure-track position for a structural geologist with a strong background in quantitative analysis of field data and research interests in regional tectonics or tectonophysics. The successful applicant will be expected to participate in the undergraduate program and give graduate courses in his/her field of expertise, conduct research, supervise graduate students, and interact with other departmental programs in regional geology and geophysics. Preference will be given to candidates with post-doctoral or industrial experience. Rank and salary commensurate with experience and research record. Please send applications or nominations as soon as possible to:

Dr. Ralph R.B. von Frese
Chairman, Search Committee
Department of Geology and Mineralogy
The Ohio State University
Columbus, OH 43210
Phone: (614) 422-5635 or 422-2721

Applications should include a resume, a statement of research interests and the names of at least three persons whom we may contact for recommendations. The closing date for applications is December 23, 1983; appointments will be effective no later than October 1, 1984. Additional information can be obtained by writing or calling the search committee chairman.

The Ohio State University is an equal opportunity/affirmative action employer.

Meteorologist/The City College of The City University of New York. The Department of Earth and Planetary Sciences invites applications for an anticipated opening in meteorology. The appointment will start September, 1984. Applicants should have completed the Ph.D. by the time of appointment and have a strong background in synoptic meteorology and computer applications. In addition, the individual should have an interest in atmospheric chemistry or pollution as applied to urban areas, or physical oceanography. The person hired will be required to teach courses in meteorology, and possibly physical oceanography as well as develop and maintain an active research program. Participation in the C.U.N.Y. Ph.D. Program in Earth and Environmental Sciences is anticipated. Rank and salary will be commensurate with experience. Send resume, transcripts and three letters of reference by November 30, 1983 to Professor Dennis Weiss, Chairman, Department of Earth and Planetary Sciences, The City College, 138 Street and Convent Avenue, New York, N.Y. 10031.

The City College of the City University of New York is an equal opportunity affirmative action employer.

Indiana University/Tenure Track Position in Igneous Petrology. The Department of Geology invites applications for a tenure track position in igneous petrology with strong emphasis on field plus experimental and/or theoretical considerations applicable to igneous rock systems. The duties of the appointment will consist of teaching on the undergraduate and graduate levels, which will include petrology, petrography, and advanced courses in his or her own interest plus establishing a creative research program. The appointment will be at the assistant professor level and will take effect in August, 1984. A doctoral degree is required. Applications, including a curriculum vitae and at least three letters of reference must be received by February 1, 1984. Please send inquiries and applications to Haydn H. Murray, Chairman, Department of Geology, Indiana University, Bloomington, Indiana 47405 (Phone: 812/335-5583). If applicants will attend the Geological Society of America meeting in Indianapolis, please arrange for an interview through the GSA employment service.

Indiana University is an equal opportunity affirmative action employer.

North Dakota State Water Commission/Geohydrologist. To work in aquifer evaluation and management. Bachelor's degree with two years experience or master's degree with experience in quantitative techniques required. Background in watershed modeling, soil physics or unsaturated flow processes desired. Salary range $1535-$2278 per month. Send resume to:

North Dakota State Water Commission
Hydrology Division
900 East Boulevard
Bismarck, North Dakota 58505

North Dakota State Water Commission is an equal opportunity/affirmative action employer.

University of Alaska/Exploration Geophysicist—Seismic Stratigrapher. Applications are invited for a tenure-track teaching/research position in the Geology/Geophysics Program of the College of Environmental Sciences. Prime responsibilities will be to teach graduate and some undergraduate courses in the use of state-of-the-art techniques in petroleum exploration geophysics. The successful applicant will also develop an innovative research program to complement our growing petroleum geology program. Doctorate is required. Industrial experience in hydrocarbon exploration and, in particular, the use of seismic reflection data to interpret stratigraphy and facies is desirable. The nine-month faculty position is open starting in January 1984. Rank and salary commensurate with qualifications and experience. Resume and at least three references should be submitted to Dr. Juan G. Roederer, Director, Division of Geosciences, University of Alaska, Fairbanks, Alaska 99701. Applications will be accepted until December 15, 1983 or until position is filled.

Your application for employment with the University of Alaska may be subject to Public Disclosure if you are selected as a finalist.

The University of Alaska is an EO/AA employer and educational institution.

South Dakota School of Mines and Technology. Applications are invited for two positions which may be available in the Department of Geology and Geological Engineering. Both involve teaching at the graduate and undergraduate levels, thesis direction, and the development of research.

Geological Engineering: specialty in rock or soil mechanics, site evaluation, geohydrology, petroleum/reservoir engineering or engineering seismology. Industrial experience is desirable. A Ph.D. in an area of engineering is preferred.

Coal Geology: applicants should have a strong background in coal petrography, preferably with experience with U.S. coals. Experience as a palynologist/paleobotanist is desirable. The Ph.D. is required.

The department has an undergraduate enrollment of 170 majors and a graduate enrollment of 60. Field applications are emphasized. Interested persons should send a resume and three letters of recommendation to William Roggenthen, Dept. of Geology/Geological Engineering, South Dakota School of Mines & Technology, Rapid City, S.D. 57701. Deadline for application is December 15, 1983.

SDSM&T is an equal-opportunity employer.

University of Cincinnati/Junior Level Tenure Track Position. The Civil & Environmental Engineering Department of the University of Cincinnati invites applicants for a junior level tenure track position. Applicants should have teaching and research interests in one or more of the following areas: Hydraulics and Hydrology, Geotechnical Engineering, Transportation or Structural Materials. The appointment enjoys significant research funding, and applicant would be expected to be a part of that activity. A Ph.D. in Civil Engineering or a closely related area is required. Send resume to: Dr. James F. McDonough, Head, CEE, Mail Location #71, University of Cincinnati, Cincinnati, Ohio 45221.

The University is an equal opportunity/affirmative action employer.

Trent University/Environmental and Resource Studies Program. The Trent Aquatic Research Group invites applications for a Research Associate with interest in movement of radioactive isotopes through aquatic ecosystems. Previous experience in lab and field research in low level isotope measurement or chemical speciation is required. Applicants should possess a Ph.D. in Applied Limnology, Chemical Engineering or equivalent. The position will commence on November 1, 1983. Send resume of application with C.V. and copies of published papers to: Dr. R. D. Evans, Environmental Sciences, Trent University, Peterborough, Ontario, Canada.

University of North Carolina/Faculty Opening. Tenure track vacancy at Assistant or Associate Professor for Coastal Process Sedimentologist with interest in sediment dynamics or geochemistry or Experimental Marine Ecologist with interest in micrograzers, zooplankton or larvae available September 1984.

Also, a position as Research Assistant Professor of Marine Science. Two year term appointment renewable once, available Spring 1984.

To apply for either position send resume, letter describing research interests, and three references to:

Dr. Dirk Frankenberg, Director
Institute of Marine Sciences
3407 Arendell Street
Morehead City, NC 28557

Closing Date—January 1984. The University of North Carolina at Chapel Hill is an Equal Opportunity/Affirmative Action Employer.

LEADER, ATMOSPHERIC TRACE GAS SAMPLING AND ANALYSIS GROUP

Ames Research Center 135 miles south of San Francisco is seeking a senior investigator and group leader for the atmospheric trace gas measurement team charged with making major advances in understanding atmospheric composition and processes, including atmospheric biogeochemical cycles. Advanced research instruments are flown on aircraft, and sampling strategies and constituents are selected to address specific problems, such as stratospheric-tropospheric exchange, the composition of the natural and perturbed troposphere, atmosphere-biosphere interactions, and the role of precursor gases in the evolution of climatically significant aerosols.

Specified qualifications include: 1) Ability to advance, advocate, and defend programs (double-weighted); Ability to motivate, develop, evaluate, and reward subordinates (double-weighted); Knowledge of current theories regarding important atmospheric chemistry problems and the relevance of measurements to these theories (double-weighted); 2) Ability to direct and conduct all phases of research projects that advance the state of knowledge of atmospheric chemistry; 3) Ability to design and develop state-of-the-art trace gas sampling/sensing instrumentation within cost and time constraints. 4) Skill in communicating schedules, plans, scientific goals, and operational constraints involved in flight missions. U.S. citizenship and Ph.D. or equivalent in atmospheric chemistry or one of the space sciences is required. Permanent position in federal service. Salary ranges from $41,277 to $63,115 commensurate with experience/education. For further information regarding requirements and application procedures, write 45-3ZC at the address below or phone (415)965-5084. Formal applications must be filed by March 12, 1984. An equal opportunity employer.

University of Florida. The Department of Geology invites applications for a tenure-track position beginning with the fall term, 1984. The position will be filled at the assistant or associate professor level. A Ph.D. is required and salary will be commensurate with qualifications. Although any research specialty will be considered, preference will be given to those with interest in these general areas: geochronology-isotope geology or low-temperature geochemistry-chemical sedimentology. Send curriculum vitae and 3 letters of reference by January 15, 1984 to: Dr. N.D. Opdyke; Department of Geology; 1112 GPA; University of Florida; Gainesville, Florida 32611.

The University of Florida is an equal opportunity/affirmative action employer.

University of Rhode Island/Marine Research Specialist V. Responsible for program development related to processing and display of data from SEA BEAM and seismic reflection systems used in mapping sea floor. Operate and maintain sophisticated shipboard geophysical equipment, with 3 months a year at sea with equipment. Bachelor's or Master's Degree in Computer Science, Physical Science or Engineering or equivalent experience (proven programming ability in FORTRAN and ASSEMBLY languages, and VAX/VMS operating systems) is required as are excellent written and verbal communication skills. Salary range: $22,452 to $28,318. Submit resume by October 21, 1983 to: Robert S. Detrick, Marine Specialist V Position, University of Rhode Island, P.O. Box 357, Kingston, Rhode Island 02881.

An Equal Opportunity/Affirmative Action Employer.

The University of Missouri-Columbia/Faculty Positions. The University of Missouri-Columbia Department of Geology plans immediate expansion through the addition of three tenure-track faculty positions. Appointments are anticipated at the assistant professor level, although higher ranks may be possible, beginning in August of 1984. Candidates will be expected to have completed requirements for the Ph.D. degree by that time. Faculty members are required to provide quality instruction at both undergraduate and graduate levels, and conduct research leading to scholarly publications. Successful candidates will be chosen from the following specialties:

Exploration Geophysics
Solid-Earth Geophysics
Hydrogeology
Analytical Structural Geology
Clastic Sedimentology

Applications should send a resume, transcripts, and names and addresses of three references to:

Tom Freeman, Chairman
Department of Geology
University of Missouri
Columbia, MO 65211

Postdoctoral Awards in Ocean Science and Engineering. Woods Hole Oceanographic Institution invites applications for 1-year postdoctoral scholar awards from new and recent doctorates in fields of biology, chemistry, engineering, geology, geophysics, mathematics, meteorology, and physics, as well as oceanography. Recipients of awards are selected on a competitive basis, with primary emphasis placed on research promise.

Fellowship stipend is $22,000. Appointees are eligible for group health insurance and a modest research budget. Recipients are encouraged to pursue their own research interests independently or in association with resident staff. Completed applications must be received by January 1, 1984 for 1984–85 awards. Awards will be announced by March 1st. Write for application forms to: *Dean of Graduate Studies, P.O. Box E, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543.*

Equal Opportunity/Affirmative Action Institution.

Professor of Marine Geophysics Tectonics/Stanford University. The Department of Geophysics is seeking candidates for a tenure track position in the broad area of marine geophysics and tectonics. We seek a creative scientist with experience in gathering, interpreting, and synthesizing marine geophysical data and whose research interests cover depositional, igneous, and tectonic processes on oceanic plates and continental margins. Inquiries are invited from marine geophysicists with demonstrated scientific record in one of the above aspects of marine geophysics or tectonics, who have demonstrated an ability to develop new ideas and research directions, and to guide and teach graduate and undergraduate students. In considering this appointment we are interested in maximizing interactions with ongoing research groups in marine geology, plate tectonics, paleomagnetism, seismology and regional geology at Stanford. Our new faculty member will be expected to develop a strong research program involving both government and industrial participation.

Salary and rank will be commensurate with experience and background. Please submit a resume, a brief description of teaching and research interests, and references to:

Dr. Amos Nur
Department of Geophysics
321 Mitchell Building
Stanford University
Stanford, CA 94305

Stanford University is an equal opportunity employer, and encourages the application of qualified women and minorities.

Syracuse University/Faculty Position in Structural Geology. Syracuse University invites applications for a faculty position in structural geology or a related field to be filled on or after September 1, 1984. Tenure track position, salary and rank open. Ph.D. or equivalent required. Applications accepted until the position is filled. Contact John Dickey, Chairperson, Department of Geology, Heroy Geology Laboratory, Syracuse University, Syracuse NY 13210, 315-423-2672.

Syracuse University is an Equal Opportunity/Affirmative Action Employer.

STUDENT OPPORTUNITIES

AGU Congressional Science Fellowship. Individuals who are AGU members and U.S. residents are invited to apply for a 1-year assignment on the staff of a congressional committee or a House or Senate member as an advisor on a wide range of scientific issues affecting public policy questions.

Applicants should have a broad background in science; be articulate, literate, and flexible; and be able to work well with people from diverse professional backgrounds.

A public policy background is not required, although such experience and/or a demonstrable interest in applying science to the solution of public problems is desirable.

The fellowship carries with it a stipend of up to $28,000 plus travel allowances.

How to apply:

Applicants should submit a letter of intent, a curriculum vitae, and three letters of recommendation. The letter of intent should include a statement of why the fellowship is desired, how you qualify for it, what issues and congressional situations interest you, what role you envision as a congressional science fellow, and what outcome you hope for in relation to career goals. The individuals from whom you request letters of recommendation should discuss your professional competence and other aspects of your background that make you particularly qualified to serve as a Congressional Science Fellow.

Send your application to: Department MP, Congressional Science Fellowship, AGU, 2000 Florida Avenue, N.W., 20009

Application Deadline: March 31, 1984

GRADUATE STUDENT NASA TRAINEESHIPS

The Florida State University is accepting applications from prospective graduate students for participation in its NASA sponsored Traineeship Program in Oceanographic Remote Sensing Techniques and Physics of Air-Sea interaction. The stipend for the calendar year is $10,600. Students may be enrolled for a degree in either oceanography or meteorology. For further information or application, please write:

Dr. James J. O'Brien
NASA Traineeship Program
Meteorology Annex
The Florida State University
Tallahassee, Florida 32306
(904) 644-4581

SERVICES, SUPPLIES, COURSES, AND ANNOUNCEMENTS

SHORT COURSE. Workshop in Advanced Remote Sensing and Spatial Data Analysis for Exploration Geology. November 14–18, 1983, EROS Data Center, Sioux Falls, South Dakota. To introduce geoscientists to geological data bases that incorporate geological, geophysical, geochemical, remotely sensed, topographic, and geographic data types. Previous experience in the analysis and interpretation of geophysical data, or geochemical data, or remotely sensed data is required.

Tuition: $550. Joseph R. Francica, Applications Branch, EROS Data Center, Sioux Falls, So. Dakota 57198, tel: 605-594-6114; FTS: 784-7114.

JOURNAL OF THE AUSTRALIAN MATHEMATICAL SOCIETY, SERIES B/Special Issue on Waves in Fluids. The issue contains 8 current research papers on water waves, linear and nonlinear, internal waves and Rossby waves. The authors are P.J. Bryant, D.H. Peregrine, R.J. Sobey and F.J. Colman, F. Vieira and V.T. Buchwald, John W. Miles, N.T. Hung and S.A. Maslowe, Roger J. Hughes and C.H. Emdry, R.L. Hughes and F.M. Leslie. It was compiled and edited by Roger Grimshaw.

Date: July, 1983 (Volume 25, Part 1)

Price for separate sale: U.S.$22, 144 pages.

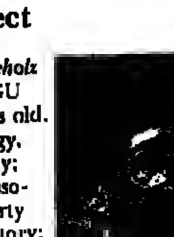
Order from the Business Manager, Australian Mathematical Society, Department of Mathematics, University of Queensland, St. Lucia, Queensland, 4067, Australia.

AGU

Section Candidates

Eos is carrying biographies and photographs of all candidates for President-elect, General Secretary, and Foreign Secretary of the Union and for President-elect and Secretary of each Section. In addition, statements by the candidates for Union offices and for Section President-elect will appear. The material for the Tectonophysics Section appears below. The material for the sections of Geodesy, Geomagnetism and Paleomagnetism, and Planetology appeared in the August 30 issue; the material for the Atmospheric Sciences Section appeared in the September 27 issue. The slate of candidates for all offices was carried in the June 21 issue.

Tectonophysics: President-elect



Christopher H. Scholz A member of AGU since 1968; 40 years old. Professor of Geology, Columbia University; Senior Research Associate Lamont-Doherty Geological Observatory; B.S., Geological Engineering, Nevada, 1964; Ph.D., Geology, MIT, 1967. Major interests: rock mechanics, earthquake source mechanism, and tectonics. Fellow, Caltech, 1967–68; Sloan Fellow, 1975–77; Green Fellow, UCSD, 1981–82. Fellow, AGU; member SSA. Former member of NAS/NRC National Committees on Rock Mechanics and Seismology. Member of several NASA and USGS committees. Secretary, AGU Tectonophysics section, 1982–1984. 75 publications, 29 in AGU journals.

Statement

"I'm generally concerned that major geophysical problems become more, rather than less, interdisciplinary with time. This is reflected in my two major concerns with AGU, namely the journals and the meetings.

"I am in favor of JGR retaining its present format and that it remain the foremost journal in geophysics in the world. In that I would resist any further splitting of the journal into smaller subsections and the addition of options, such as papers published primarily in microfiche or the subscription to small, specialized categories of reprints. I do this in spite of the information explosion and the rapidly dwindling bookshelf space in my office. I would also resist further proliferation of new AGU journals.

"I also support a continued, tough reviewing process for JGR and the other AGU journals such as *Geophysical Research Letters* and *Tectonics*, and that the review standards be maintained nearly equal for all these AGU journals.

"Unless convinced otherwise, I would think that it would be a good idea that, for one of the two national meetings, Tectonophysics and Seismology hold a separate meeting. These two sections overlap considerably, and a separate meeting of these two sections would provide a smaller, more congenial meeting in which more interaction could occur while at the same time reducing the problem of finding a large enough site for the meeting, a problem that has plagued AGU for several years. At the same time, I would strongly support an all-union meeting to be held once a year."

Richard P. Von Herzen A member of AGU since 1959; 53 years old. Senior Scientist and Chairman, Department of Geology and Geophysics, Woods Hole Oceanographic Institution. Scientific interests: solid earth geophysics, esp. marine geothermal investigations, electromagnetic induction, and sea floor tectonics. B.S., geophysics, Caltech, 1952; M.A., geological sciences, Harvard University, 1956; Ph.D. marine geophysics, Scripps Institution of Oceanography, 1960.

Assistant research geophysicist, Scripps Institution of Oceanography, 1960–1964; deputy director, Office of Oceanography, UNESCO, 1964–1966; research staff at Woods Hole Oceanographic Institution, 1966-present. Visiting research geophysicist and lecturer, Scripps Institution, 1974–1975; Department of Earth and Planetary Sciences, MIT, 1982. Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES): Atlantic Panel 1968–1968; Chairman, Heat Flow Panel, 1967–1973; Chairman, Downhole Measurements Panel, 1981–1983; Planning Committee, 1982-present.

Participant in about 35 oceanographic cruises, as chief scientist for about 12. Oceanography review panel, NSF, 1971–1974. Vice-[illegible] International Heat Flow Committee, IUGG, 1971–1975; Secretary, 1975–1979. Author or coauthor of 75 scientific papers, 27 in AGU journals. Associate editor, JGR, 1969–71.

Statement

"A general definition of Tectonophysics as the study of the behavior of earth materials encompasses very broad ranges in space and time domains. Dimensions range from molecular (friction) to thousands of kilometers (tectonic plates), and time scales from 10^{-1} seconds (seismic waves) to 10^{8} years (convection). The variety of investigations within tectonophysics is correspondingly large, such as to include narrowly-focused experts and broad generalists, all with needs to communicate with each other. Increasing effectiveness of scientific communication should continue to be a primary goal of the AGU.

"Progress over the past few years in many subfields of tectonophysics is summarized in the U.S. National Report to the IUGG, 1979–1982, recently published by AGU. In many of these articles, one has the impression of a relatively healthy balance between theory, observation, and experiment, reflecting the vigorous advances in these disciplines. The wide recognition and modeling of tectonic plates as boundary layers for deep-seated processes emphasize the differences between shallow vs. deep tectonic phenomena in the earth. Many studies in tectonophysics bear heavily on other disciplines such as structure and composition of the earth's interior, and vise-versa.

"Theoretical and experimental models presently play a major role in understanding convection in the earth, whereas new observational techniques have been crucial in better defining the relative importance of vertical vs. horizontal deformation in the lithosphere. A common substance on earth, H_2O, is probably important if not critical for many tectonophysical disciplines, namely, rock strengths, strain rates, heat flow, etc. Increased opportunities for contact and communication with our colleagues in physical chemistry and hydrology will probably help resolve many outstanding problems here.

"New techniques of observation and measurement are likely to contribute to signifi-

AGU (cont. on p. 590)

AGU *(cont. from p. 589)*

cant advances in tectonophysics in the near future. Deep reflection profiling on both continents and oceans (e.g., COCORP, BIRPS) provides the important third dimension in the most little part of the crust. Deep drilling, also both at sea and on land, gives us the necessary "ground truth" after geophysical surveys and other remote sensing, and also the access to in situ experiments at depth. When long-term seismometer networks become feasible to emplace at sea, perhaps in boreholes, advances in understanding plate structure and tectonics of plate boundaries may be comparable to the advances in tectonophysics realized after installation of the world-wide seismic network. Finally, observations from satellites should continue to expand from their promising beginnings, with studies ranging from refinement of the geoid, definition of surface tectonics in remote areas, and perhaps even real-time measurements of relative plate movements.

"Communication is important to most of us, not only within our own national borders, but also with our colleagues abroad. Like all geological disciplines, tectonophysics is not divided along political boundaries, and we can learn much from foreign colleagues who emphasize different disciplines than our own national programs. Particularly in times of difficult political situations, AGU's private status and its commitment to international cooperation can be used to keep us better informed. For example, the experience over the past several years in the USSR in drilling superdeep holes on land for scientific purposes should certainly be studied as thoroughly as possible before similar attempts are launched in the U.S. or other countries. Some of the limited resources of the AGU could be used to enhance scientific communications between U.S. and foreign scientists. If elected, I would be receptive to explore more effective ways in which AGU can foster direct communications (visits, meetings) with foreign scientists, when appropriate to advance understanding of tectonophysical problems."

Tectonophysics: Secretary

Barry Parsons A member of AGU since 1973; 34 years old. Associate professor of geophysics in the Department of Earth and Planetary Sciences, MIT. Primary research interests are in the fields of marine geophysics and tectonics, especially the use of marine geophysical observations to elucidate dynamical processes within the earth. B.A., theoretical physics, 1969, and Ph.D., geophysics, 1973, from the University of Cambridge; at MIT since 1973. Published 21 articles, including 11 in AGU journals. Recent publications include: Causes and consequences of the relation between area and age of the ocean floor, JGR, *87*, 289, 1982, and The relationship between surface topography, gravity anomalies, and temperature structure of convection, JGR, *88*, 1129, 1983.

Wayne Thatcher A member of AGU since 1968; 40 years old. Geophysicist, U.S. Geological Survey. Major interests: earthquake mechanism and crustal deformation, observational seismology. B.Sc. (Honors), physics and geology, McGill University, 1964; Ph.D., seismology, Caltech, 1971. Research geophysicist at U.S. Geological Survey, Menlo Park, Calif., 1971-present. Member SSA. Member, NAS/NRC Committee on Geodesy. 35 publications, 19 in AGU journals, including Source parameters of southern California earthquakes (with T.C. Hanks), 1973; Strain accumulation and release mechanism of the 1906 San Francisco earthquake, 1975; Systematic inversion of geodetic data in central California, 1979. Associate editor, *Geophysical Research Letters*, 1976–1978; associate editor, *Journal of Geophysical Research*, 1980-present.

Meetings

New Listings

A boldface meeting title indicates sponsorship or cosponsorship by AGU.

June 18–22, 1984 **Fifth International Conference on Finite Elements in Water Resources**, Burlington, Vt. Sponsors, University of Vermont, AGU. (J. P. Laible, Dept. of Civil Engineering and Mechanical Engineering, Univ. of Vermont, Burlington, VT 05405; tel.: 802-656-3800.)

June 25–July 7, 1984 Committee on Space Research (COSPAR) 25th Meeting, Graz, Austria. (Richard C. Han, Space Science Board, JH-828, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, DC 20418.)

The complete Geophysical Year last appeared in the August 30, 1983, *Eos*.

Nominations for Medals and Awards

William Bowie Medal. Awarded for outstanding contributions to fundamental geophysics and for unselfish cooperation in research.

Maurice Ewing Medal. Honors an individual who has led the way in understanding the physical, geophysical, and geological processes in the ocean; who is a leader in ocean engineering, technology, and instrumentation; or who has given distinguished service to the marine sciences.

Robert E. Horton Medal. Given for outstanding contributions to the geophysical aspects of Hydrology.

James B. Macelwane Awards. Up to three awards are given each year for significant contributions to the geophysical sciences by a young scientist of outstanding ability. Recipients must be less than 36 years old.

Letters of nomination outlining significant contributions and curriculum vitae should be sent directly to the appropriate committee chairmen: *Bowie Medal* - Eugene M. Shoemaker, U.S. Geological Survey, 2255 Gemini Drive, Flagstaff, AZ 86001; *Ewing Medal* - Robert O. Reid, Department of Oceanography, Texas A&M University, College Station, TX 77843; *Horton Medal* - R. Allan Freeze, Department of Geological Sciences, University of British Columbia, Vancouver, B.C., Canada V6T 1W5; *Macelwane Award* - J. Freeman Gilbert, IGPP A-025, University of California/San Diego, La Jolla, CA 92093.

Deadline for Nominations is November 1, 1983.

GAP

Separates

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Exploration Geophysics

0920 Electrical Methods
TRANSIENT ELECTROMAGNETIC RESPONSE FROM A THIN DYKE IN THE EARTH
A. Q. Howard Jr., (Electrical & Computer Engineering Department, University of Arizona, Tucson, AZ 85721), K. Kabulsi

An electromagnetic solution for a thin tabular conductor in a lossy medium is presented. This is an extension of "Maxwell's Theorem". Both impulsive and time harmonic electric line sources are analyzed. The orientation of the source is parallel to the sheet conductor. This assumption renders the problem two-dimensional. The solution and associated analytical results have application to geophysical probing. For example, the sheet can model a conducting ore dyke or a fluid filled crack in an induction logging application. Transient numerical results are seen to be diagnostic of the conductivity thickness product W = rd. (Electromagnetic, transient response, analytical results).
Rad. Sci., Paper 3S1396

Geochemistry

Meteorology

Hydrology

Oceanography

Particles and Fields—Interplanetary Space

Particles and Fields—Ionosphere

Particles and Fields—Magnetosphere

ent is less than 1 or A nT. Using the analytic solutions, initial distribution functions are mapped into final (accelerated) distributions, and the analytic mappings are compared with numerical mappings. (Particle motion, current sheets, electric fields, analytical approximation).
J. Geophys. Res., Blue, Paper 3A1485

*On leave from: School of Physics, University of Sydney, Sydney, NSW, 2006, Australia.
+On leave from: Department of Astro-Geophysics, University of Colorado, Boulder, Colorado, 80309, U.S.A.
J. Geophys. Res., Blue, Paper 3A1481